Contribution ID: **124** Type: **Oral**

SND@LHC: a roadmap for neutrino detection at LHC and HL-LHC

Monday, 27 May 2024 12:10 (20 minutes)

SND@LHC is a compact and stand-alone experiment to perform measurements with neutrinos produced at the LHC in the pseudo-rapidity region of $7.2 < \eta < 8.6$.
The detector being used to take data during Run 3, located 480~m downstream of IP1, is composed of a hybrid 830~kg target with tracking capabilities, followed by a calorimeter and a muon system. The target alternates bricks of emulsion cloud chambers and scintillating fibre tracker layers with good spatial and time resolution. The Veto, HCAL and Muon detector use scintillating bars with different geometries and photodetectors optimised for the physics performance. All active detectors are read out by silicon photomultipliers connected to custom read-out electronics based on the TOFPET2 ASIC, providing noise suppression, charge and time information. The DAQ system operates in a trigger-less fashion.
The experimental configuration allows to distinguish between all three neutrino flavours, opening a unique opportunity to probe physics of heavy flavour production at the LHC in the region that is not accessible to ATLAS, CMS and LHCb. The detector has been commissioned and installed in 2021-2022. A first set of data has been collected, providing the first observation of neutrinos produced at a collider. Further analysis is ongoing.
The first phase aims at operating the detector throughout LHC Run 3 to collect a total of 250~fb^{-1}. A thorough detector upgrade is foreseen for Run 4: the new detector will replace emulsions with silicon sensors and will use a magnetised HCAL, as well as add a muon spectrometer. In addition, the installation of an additional detector with complementary pseudorapidity coverage is foreseen, aimed at greatly reducing the systematics on the charm production measurement.
This talk will introduce the SND@LHC experiment and describe both its current detector and the foreseen upgrade, which letter of intent is being finalised in these days.

Collaboration

SND@LHC

Role of Submitter

The presenter will be selected later by the Collaboration

Primary author: GRAVERINI, Elena (Università di Pisa / INFN / EPFL)

Presenter: GRAVERINI, Elena (Università di Pisa / INFN / EPFL)

Session Classification: Integration and Detector Systems - Oral session

Track Classification: T8 - Integration and Detector Systems